ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF SPILL PREVENTION AND RESPONSE

Guidance No. SPAR 99-3 December 22, 1999

POLICY FOR ESTABLISHING CLEANUP LEVELS FOR SITES IN THE ARCTIC ZONE IN ACCORDANCE WITH 18 AAC 75, ARTICLE 3

PURPOSE:

This policy describes the application of the soil and groundwater cleanup level requirements of 18 AAC 75, Article 3 to sites located in the Arctic zone, defined as north of latitude 68 degrees north and areas south of that latitude determined to be underlain by continuous permafrost.

BACKGROUND:

The department has made a general determination that the presence of continuous permafrost in the Arctic zone acts as a barrier for soil contaminant migration to a groundwater zone of saturation. Therefore, the migration to groundwater pathway does not naturally exist for sites located in the Arctic zone. Seasonally however, groundwater exists beneath the surface of the soil in the Arctic zone, and it can act as a transport medium for soil contaminants. This transport pathway must be evaluated in developing a soil cleanup level under methods two, three or four, as required by 18 AAC 75.340(c). This policy paper clarifies the implementation of the soil and groundwater requirements of 18 AAC 75, Article 3 and the definition of groundwater under 18 AAC 75, Article 9 to the evaluation of seasonal groundwater as a pathway for soil contaminant migration.

APPLICABILITY:

This policy is applicable to staff in the Division of Spill Prevention and Response overseeing the cleanup of sites located in the Arctic zone.

ACTION:

The Division of Spill Prevention and Response will use this guidance document when evaluating proposed cleanup levels and cleanup actions at sites located in the Arctic zone.

ATTACHMENT:

Guidance for Establishing Cleanup Levels for Sites in the Arctic Zone

APPROVAL:

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Date

Establishing Cleanup Levels for Sites in the Arctic Zone

Regulations under 18 AAC 75, Article 3 establish soil and groundwater cleanup levels for sites contaminated by hazardous substances. The department has identified three exposure pathways for which soil cleanup levels have been developed: ingestion of contaminated soil, inhalation of contaminants in air above contaminated soil, and contaminant migration to groundwater. Other complete exposure pathways must be addressed site-specifically. In accordance with 18 AAC 75.341, the migration to groundwater pathway for sites in the Arctic zone is not considered due to the presence of continuous permafrost that acts as a barrier for contaminant migration to a groundwater zone of saturation that is a current or reasonably expected future source of drinking water. However, soil contaminant migration can occur via seasonal groundwater present beneath the surface of the soil above the permafrost layer (suprapermafrost groundwater). To the maximum extent practicable, migration of contamination in suprapermafrost groundwater must be eliminated. A demonstration must be made that the selected soil cleanup levels and cleanup remedy address off-site migration of contamination. Long term monitoring of suprapermafrost groundwater, if technically feasible, may be required to ensure migration of soil contamination has ceased.

Groundwater Definition

Groundwater is defined in 18 AAC 75.990 as:

> "water in the saturated zone, for purposes of evaluating whether the groundwater is a drinking water source under 18 AAC 75.350; or
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> water beneath the surface of the soil, for purposes of evaluating whether the water will act as a transport medium for hazardous substance migration"

The application of this definition to suprapermafrost groundwater in the Arctic Zone is discussed below.

Suprapermafrost Groundwater

The department recognizes that permafrost acts as a barrier for soil contaminant migration to a subpermafrost zone of saturation. However, suprapermafrost groundwater can seasonally exist above the permafrost layer as soil moisture or within a seasonal saturated zone. The department acknowledges that due to the proximity to the surface of the soil, limited vertical extent and its transient nature, suprapermafrost groundwater would not likely pose a risk to human health as a potential drinking water source. However, suprapermafrost groundwater can act as a transport medium for soil contaminants. Therefore, the department requires that the proposed soil cleanup levels and the cleanup technique(s) selected eliminate the transport of contaminants off-site to the maximum extent practicable. In addition, the following requirements must be met, as applicable.

Groundwater Hydrologically Connected to a Surface Water Body

For sites with an adjacent surface water body, regulations under 18 AAC 75.340(c) require soil cleanup levels developed under method two, three or four to be protective of surface water quality standards. In addition, regulations under 18 AAC 75.345(f) require that groundwater closely connected hydrologically to nearby surface water not cause a violation of water quality standards in 18 AAC 70.020 for the receiving surface water or sediment. Therefore,

suprapermafrost groundwater will be evaluated as a transport medium for contaminant migration from soil to a receiving surface water body. The proposed soil cleanup levels and the cleanup action taken at the site must result in reducing or eliminating this transport pathway so water quality standards are met in the receiving surface water and sediment.

Groundwater Hydrologically Connected to Groundwater in a Zone of Saturation

If suprapermafrost groundwater is a potential transport medium for soil contamination to a groundwater zone of saturation, the proposed soil cleanup levels and the cleanup action taken at the site must result in reducing or eliminating this transport pathway so the receiving groundwater is not adversely impacted. This may occur where drinking water wells that access a subpermafrost aquifer are located in the vicinity of contaminated suprapermafrost groundwater.

Other Complete Exposure Pathways

Other complete exposure pathways, such as volatilization, should be evaluated on a site-specific basis to ensure protection of human health, safety and welfare and of the environment.

Applicability

This policy applies to all sites in the Arctic Zone, including sites located on gravel pads and roads. This policy does not apply to sites in the Arctic Zone underlain by unstable or discontinuous permafrost or a thaw bulb or where the department has determined that seasonal suprapermafrost groundwater is a current or potential source of drinking water based on an evaluation of the factors in 18 AAC 75.350. This policy does not apply to sites where the department has determined that any cleanup action would cause more severe or long-term damage than would the discharge or release alone.

Terms used in this document have the meaning given in 18 AAC 75.990.